

APPLICATION FOR PERMIT FOR SCIENTIFIC PURPOSES

Prepared for:

National Marine Fisheries Service

Protected Resources Division
525 NE Oregon Street, Room 500
Portland, Oregon 97232

Prepared by:

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July 17, 2006

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A. TITLE

Title

Application for Permit for Scientific Purposes under the Endangered Species Act of 1973.

Project Names

Middle Skagit River Salmon Spawning Surveys
Baker River Basin Electrofishing Surveys

B. SPECIES

Puget Sound ESU Chinook salmon (*Oncorhynchus tshawytscha*)

C. DATE OF APPLICATION

July 17, 2006

D. IDENTITY OF APPLICANT

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E. INFORMATION ON PERSONNEL, COOPERATORS, AND SPONSORS

E.1 Identify Principal Investigator and Field Supervisors, including email, phone number and resume for each.

See Appendix A for resumes of all personnel.

Principal Investigator:

Nicholas E. Verretto, Puget Sound Energy (PSE)
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Field Supervisors:

Arnold A. Aspelund (PSE), arnie.aspelund@pse.com, (425) 462-3442
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Phil J. Hilgert, R2 Resource Consultants (R2), philgert@R2usa.com, (425) 556-1288

E.2 Field Personnel:

Michael A. Ficklin (PSE)
Charles W. Ledford (PSE)
Vivien T. Whitton (PSE)
Nick L. Nickelson (PSE)
Adam D. Weybright, (R2)
Catherine M. Morello (R2)
Michael R. Gagner (R2)

E.3 Identify all Cooperating Institutions and provide contact information

Not Applicable

E.4 Statements

A qualified member of the PSE staff shall supervise the taking of species identified in this permit application. Resumes are included in Appendix A.

A letter from R2 Resource Consultants is included as Appendix B indicating agreement to operate under any and all permit conditions, should a permit be granted to Puget Sound Energy, Inc.

E.5 Disposition of Specimens

No Chinook salmon specimens will be retained in association with the proposed studies; all samples will be returned to the capture site.

E.6 Transport of Species

Not applicable

F. PROJECT DESCRIPTION, PURPOSE, AND SIGNIFICANCE

F.1 Justification of Objectives

The Baker River Hydroelectric Project (the Baker Project), Federal Energy Regulatory Commission (FERC) No. 2150, is owned and operated by Puget Sound Energy, Inc. (PSE). The Baker Project consists of two hydroelectric generating developments located on the Baker River, in Washington State. PSE is in the process of obtaining a new, long-term operating license for the Baker Project. On April 7, 2006, the FERC issued a draft environmental impact statement for relicensing of the Baker River Hydroelectric Project (FERC 2006) and included a list of proposed license articles in Appendix A of the draft EIS document. PSE is

currently operating under the terms of an annual operating license issued by the FERC on May 5, 2006. PSE is continuing to conduct research and collect information to support the ongoing relicensing process and to comply with the Endangered Species Act. The proposed studies identified in this application document are part of these ongoing efforts.

Middle Skagit River Salmon Spawning Surveys

The objective of the proposed spawning surveys is to estimate the number or percentage of redds or both of listed species at risk of exposure during low flow conditions in the Skagit River downstream of the confluence of the Baker River. The survey information will also be used to identify the timing and distribution of Chinook salmon spawning in the middle Skagit River. This study is a continuation of previous efforts conducted by PSE and R2 during 2002-2005 under authorization of NMFS Permit #1372, which expires December 31, 2006. Chinook salmon in the Puget Sound Evolutionary Significant Unit (ESU) were listed as threatened under the ESA in 1998 based upon the predominantly negative long-term and short-term trends in abundance for stocks throughout the ESU (63 Federal Register 11482). The fall run of Lower Skagit River Chinook that spawn downstream of the Sauk River confluence is considered depressed based on long term and short term negative declines in abundance (WDFW et al., 1994). The average annual escapement for the Lower Skagit River Fall Chinook during the period of 1993-2002 is 1,859 (Castle 2003). The results of the proposed study will provide resource managers with information to assess salmon spawning distribution, and the timing of salmonid egg incubation and fry emergence in the middle Skagit River.

Baker River Basin Electrofishing Surveys

The objective of the proposed Baker River Basin Electrofishing Surveys is to collect tissue samples for genetic analysis from juvenile bull trout in select Baker River Basin stream reaches. The tissue samples will be provided to state and/or federal laboratories and analyzed to assess potential genetic similarities or differences between bull trout populations in the Baker River and Skagit River basins. The proposed study will be conducted in support of Proposed License Articles 103 and 104, which are described in Appendix A of the draft EIS for project relicensing (FERC 2006). Proposed License Article 103 states that PSE “shall provide safe and effective upstream passage at the Baker River Project by using trapping, sorting, holding and hauling facilities located on the Baker River and other operations and facilities as appropriate for the Baker River Project, in

accordance with the plan described in this article. Facilities include new facilities and renovations to existing facilities.” Proposed License Article 104 states that PSE "shall provide a fishway between Lake Shannon and Baker Lake for native char and other native fish species that become isolated by the project". Results of the proposed Baker River Basin Electrofishing Surveys will help collect native char genetic information to guide decisions pertaining to the design and operational protocols of the new fish passage facilities. Juvenile Chinook salmon will not be targeted during the proposed effort; however, it is possible that Chinook may be present in the proposed Baker River basin survey area.

The Puget Sound ESU includes naturally spawned Skagit River Chinook populations and artificially propagated populations, including Skagit River Marblemount Hatchery summer and fall Chinook runs. The lower Baker River adult trap and upstream fish passage facility is currently used as an acclimation point for newly-released juvenile Chinook salmon from the Marblemount Hatchery. These juvenile Chinook have been observed to remain within the adult upstream trap for days to months, and an unknown number of these juvenile Chinook are inadvertently moved upstream to Baker Lake each year during regular transport of adult salmonids. Electrofishing surveys designed to capture juvenile bull trout may also capture these juvenile Chinook salmon.

Juvenile salmonids captured in downstream fish passage facilities located in Lake Shannon and Baker Lake are transported downstream and released to the Skagit River. During 2001-2005, an annual average of 1,907 juvenile Chinook was transported downstream from the downstream fish passage facilities to the Skagit River. The origin of Chinook juveniles captured at the downstream fish passage facilities is not completely understood. A portion of juvenile Chinook collected at the downstream fish passage facilities are believed to originate from the Marblemount Hatchery. Current operational protocol of the lower Baker River adult upstream fish passage facility includes the transport of spring run adult Chinook to Baker Lake. Spring run Chinook are defined as those Chinook that arrive to the trap between June 1 to August 15. During 2001-2005, an average of 34 adult Chinook were annually transported upstream and releases into Baker Lake. Adult Chinook have been observed in the upper Baker River during bull trout snorkel surveys conducted in 2001, 2003, 2004, and 2005 (R2 2006) and the progeny of those adult Chinook may be captured during the bull trout electrofishing surveys.

F.2. Is the Proposed Project in response to Federal Agency Recommendations?

Yes.

Middle Skagit River Salmon Spawning Surveys

Middle Skagit River spawning surveys were conducted in 2004 and 2005 in response to Condition No. 6 in Section 9.4 (Terms and Conditions) of the October 25, 2004 NOAA Biological Opinion pertaining to the License Amendment of the Baker River Hydroelectric Project (NOAA 2004). Condition No. 6 states that “PSE will develop and conduct an annual monitoring program to estimate the number or percentage of redds or both of listed species at risk of exposure during low flow conditions in the Skagit River downstream of the confluence of the Baker River. PSE will submit an annual report of the results of this monitoring to NOAA Fisheries by January 1 of each year. NOAA Fisheries will review and approve the monitoring plan before it is carried out.” The October 25, 2004 NOAA Biological Opinion covered operation of the Baker Project through expiration of the project license in April 2006. Under the terms of a May 5, 2006 annual operating license issued by the FERC, PSE must continue to operate the project under the terms and conditions of the prior license until a new license is issued, or the project is otherwise disposed of as provided in section 15. PSE will continue to conduct middle Skagit River Chinook spawning surveys. There are currently no federal funding sources for the proposed survey effort.

Baker River Basin Electrofishing Surveys

The proposed Baker River basin electrofishing survey effort is in response to Proposed License Article 103 (FERC 2006). Although Proposed License Article 103 does not specifically require PSE to collect bull trout tissue samples from within the Baker River Basin for genetic analysis, it is recognized by PSE and USFWS biologists that analysis and comparison of Baker River and Skagit River bull trout genetic material will facilitate decisions pertaining to Proposed License Article 103 and development of the lower Baker River upstream trap operational protocol. There are currently no federal funding sources for the proposed survey effort.

F.3. Is the proposed research part of a larger scale restoration plan?

The collection of genetic samples from juvenile bull trout is being coordinated with a proposed USFWS/USFS research effort described in:

Aubry, Carol. 2005. A study plan for genetic analysis of bull trout in five recovery areas in Washington State. Prepared by C. Aubry, U.S. Forest Service, Olympic National Forest, Olympia, WA for the U.S. Fish and Wildlife Service, Lacey, WA.

F.4. Describe any relationship of the proposed activities to other existing or proposed programs.

Middle Skagit River Salmon Spawning Surveys

Seattle City Light currently conducts salmon spawning surveys in the Skagit River upstream of the Sauk River confluence, and occasionally conducts reconnaissance survey efforts in the middle Skagit River downstream of the Baker River confluence. To the extent possible, proposed middle Skagit River survey efforts will be coordinated with Seattle City Light surveys.

Baker River Basin Electrofishing Surveys

The USFS and National Park Service staff occasionally conducts electrofishing surveys as part of other monitoring and research efforts. The proposed electrofishing efforts will be coordinated with federal and state personnel in the basin to avoid duplication of effort and to ensure any information developed is complementary to multiple study objectives.

F.5. Justification for using listed species in the proposed study and discussion of potential alternatives.

Middle Skagit River Salmon Spawning Surveys

The objective of the proposed spawning surveys is to estimate the number or percentage of redds or both of listed species at risk of exposure during low flow conditions in the Skagit River downstream of the confluence of the Baker River. The survey information will also be used to identify the timing and distribution of Chinook salmon spawning in the middle Skagit River. Observation and measurement of Chinook spawning will be necessary to quantify the risk of Chinook redd dewatering in the middle Skagit River. The selection of spawning sites and associated risk of dewatering varies by salmon species and the use of alternate species, such as chum salmon, will not provide the requested information.

Baker River Basin Electrofishing Surveys

The objective of Baker River Basin Electrofishing Surveys is to collect juvenile bull trout tissue samples from select Baker River basin tributaries for genetic analysis.

The proposed effort will not target Chinook salmon; however, juvenile Chinook may be inadvertently captured during the proposed effort.

G. PROJECT METHODOLOGY

G.1. Proposed Project Timing and Duration

Middle Skagit River Salmon Spawning Surveys

The proposed middle Skagit River spawning surveys will be conducted from the anticipated start of spawning in late August and early September until the observed end of spawning in late December. Surveys to be conducted in 2006 will be a continuation of surveys initiated in 2002 by PSE and R2, and will be covered by existing NMFS Permit #1372, which expires December 31, 2006. Duration of surveys will continue at least until the issuance of an operating license for the Baker Project and may extend beyond licensing of the Baker Project. For this reason it is requested that the proposed effort be authorized for five years.

Baker River Basin Electrofishing Surveys

The proposed Baker River basin electrofishing surveys will be conducted in the late spring and early summer (i.e. late June, July) of 2006 and will possibly continue in 2007 and later until 30 to 50 tissue samples are collected from juvenile bull trout. Potential take of juvenile Chinook associated with activities to be conducted in 2006 will be covered by existing NMFS Permit #1372. It is possible that the proposed electrofishing survey effort may continue for up to 4 years (2010) beyond the June 2006 start point.

G.2 Proposed Project Procedures and Techniques

G.2.a Methods of Capture and Release

See G.2.b

G.2.b Sampling Schedule, Including Locations and Dates

Middle Skagit River Salmon Spawning Surveys

Researchers will complete the proposed spawning survey efforts by incorporating aerial and jet boat survey techniques to record salmon spawn timing and redd depth and distribution in the middle Skagit River. Surveys will be conducted in the middle Skagit River (WRIA #03/04.0176) between the Baker River confluence at RM 56.5 (N48° 32.0391', W121° 44.1440') to

the pipeline crossing above Sedro Woolley at RM 24.5 (N48° 29.3718', W122° 12.1424'). Surveys will be conducted approximately every 2 weeks from the anticipated start of spawning in late August or early September until the observed end of spawning in late November. Aerial surveys will be conducted to verify spawn timing and to obtain accurate redd counts and distributions. Survey flights will be conducted over a broader reach of the Skagit River, between the Sauk River confluence (RM 67.2) and the pipeline crossing above Sedro Woolley (RM 24.5), than the jet boat surveys so that comparisons of spawn timing can be made between areas upstream and downstream of the Baker River confluence (RM 56.5). Jet boat surveys will be scheduled as soon as possible following the aerial survey. Surveyors will measure redd depth with a wading rod and horizontal distance from each redd to the river margin using a laser rangefinder. Redd counts and records of redd distributions obtained during aerial surveys will be used to facilitate location and measurement of redds during subsequent jet boat surveys and will minimize the amount of time spent traversing salmon spawning areas in the jet boat. No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort.

Baker River Basin Electrofishing Surveys

Proposed electrofishing surveys targeting juvenile bull trout will be conducted in Sulphur Creek, (WRIA #04.0488) and the mainstem and upper tributaries to the upper Baker River (WRIA #04.0435). Juvenile bull trout and possibly juvenile Chinook will be captured during the proposed electrofishing surveys. Juvenile Chinook captured during the effort will be enumerated, measured and released.

Surveyors will electrofish tributary reaches to be identified in coordination with the USFWS. Major tributaries of the upper Baker River, including Sulphide, Crystal, Scramble, Bald Eagle, and Pass creeks, will be sampled from the mouths to the upstream extent of anadromy (Table 1). The proposed surveys will be scheduled in June and July, prior to Chinook and bull trout spawning migrations, in order to minimize the risk of adult salmonids being affected by the electrofishing efforts. A team of three biologists will work in an upstream direction, including one biologist operating the backpack electrofishing unit and at least two biologists operating dip nets. Survey areas will be snorkeled prior to electrofishing in order to minimize exposure of

electric fields to adult Chinook and bull trout. Juvenile Chinook will be enumerated, sampled for length, and will be allowed to fully recover prior to release at the capture location.

Table 1. Potential survey sites for the proposed Upper Baker River Basin Electrofishing Surveys.

Stream Name	WRIA Number	Survey Area	
		Start	End
Upper Baker River, mainstem	04.0435	RM 26.0	RM 30.4
Sulphide Creek	04.0566	RM 0.0	RM 1.5
Crystal Creek	04.0574	RM 0.0	RM 0.4
Scramble Creek	04.0580	RM 0.0	RM 0.1
Bald Eagle Creek	04.0581	RM 0.0	RM 0.9
Pass Creek	04.601	RM 0.0	RM 0.3
Sulphur Creek	04.0488	RM 0.0	RM 0.8

G.2.c Description of Tagging

No Chinook will be tagged as a result of the proposed studies.

G.2.d Drug Type and Dosage

No Chinook will be anesthetized as a result of the proposed studies.

G.2.e Temporary Holding

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort.

Baker River Basin Electrofishing Surveys

Juvenile Chinook captured during the proposed electrofishing survey effort will be held following capture in order to facilitate recovery. Sanctuary nets that hold water will be used to transfer captured fish to darkened units in order to minimize stress. Battery powered aerators will also be used in the holding units in order to ensure water used to hold juvenile fish is sufficiently oxygenated.

G.2.f. Number and Types of Samples

No Chinook samples will be taken during the proposed study efforts.

G.3. Describe possible alternatives to the proposed methods that could be implemented in the event of unforeseen circumstances (i.e. changes in environmental conditions, changes in species abundance, etc). Such scenarios should be addressed in Section H if the alternative scenarios affect the potential take of listed species.

Middle Skagit River Salmon Spawning Surveys

Middle Skagit River spawning surveys have been conducted by PSE and R2 staff since 2002. Surveyors will likely use slight modifications to the above described methods in response to environmental disturbances or changes in species abundance. Historically, unfavorable survey conditions, such as poor water clarity or high middle Skagit River flows, have altered the frequency and timing of previous PSE and R2 survey efforts in the middle Skagit River. Changes in species abundance may also change survey methods. For example, in 2002 when high numbers of Chinook and Chum redds were visible in the middle Skagit River survey reach, surveyors utilized a helicopter during aerial flights rather than fixed a wing Cessna in order to improve survey coverage. In general, the study methods and techniques described above will remain consistent. These possible alternative methods are not likely to affect the take estimates described in Section H.

Baker River Basin Electrofishing Surveys

One alternative capture method is to use hand dip nets to capture juvenile bull trout during nighttime snorkel surveys. This method was employed in Sulphur Creek, a tributary to Lake Shannon, in 2005 by snorkel surveyors with little success. A total of four juvenile bull trout were captured using hand net capture methods during two nighttime snorkel surveys in Sulphur Creek in 2005. This capture method is much less effective than electrofishing and during a review of the proposed study plan; USFWS biologists suggested using electrofishing to collect the desired 30-50 samples.

G.4. Potential for injury or mortality to the animals involved, steps to minimize adverse effects and to ensure that animals will be taken in a humane manner.

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort, thus no mortality or injury is expected.

Baker River Basin Electrofishing Surveys

The proposed Baker River Basin electrofishing survey efforts will target juvenile bull trout in Sulphur Creek and headwater areas of the upper Baker River subbasin. Few juvenile Chinook are likely to be present in the proposed survey areas.

In a recent study on the Green River in Washington, immediate mortalities to juvenile Chinook salmon resulting from electrofishing capture and handling processes were minimal, ranging from 0.1 - 0.5% (Jeanes and Hilgert 2000; Hilgert and Jeanes 1999). In 1998, R2 Resource Consultants captured 2,586 juvenile Chinook (mean = 48.2 mm; min. = 31 mm; max. = 208 mm; std. dev. = 9.8 mm) using backpack electrofishing techniques and encountered 4 (0.1%) total immediate injuries (visible injuries and immediate mortalities). In 1999, R2 captured 723 juvenile Chinook using electrofishing techniques and of this total 4 (0.5%) juvenile Chinook were injured (3 visible injuries and 1 immediate mortality).

Fredenberg (1992) found that smooth DC waveforms injured significantly fewer rainbow trout and brown trout (*Salmo trutta*) in Montana river systems than other electrical waveforms (i.e., rectified AC, pulsed DC, and CPS). During a study by Dalbey (1996), smooth DC injured fewer fish (12%) than pulsed DC (40-54%) in fish ranging in size from 153-388 mm (FL). The potential exists for sublethal spinal injuries that are not visible on fish to occur (Dalbey et al. 1996). Dalbey (1996) found that, when X-rayed, approximately 37% of the fish in the study suffered from spinal injuries and that injury rates and severity of injury were positively correlated with fish length ($r = 0.70-0.83$, $P < 0.02$). Survey areas will be snorkeled prior to electrofishing to ensure the absence of adult and subadult Chinook and bull trout. Hollender and Carline (1994) reported injury rates of 14% on small (<125 mm TL) brook trout (*Salvelinus fontinalis*) captured using backpack electrofishing units. However, unlike Dalbey (1996) and Fredenberg (1992), they did not test smooth DC current. Smooth DC current would likely result in injury rates less than 14%. All electrofishing surveys will be conducted using DC only.

Often, stress, not electrofishing injury, has been correlated to the reduced survival of juvenile salmonids exposed to electrofishing (Nielsen 1998). All captured fish will be held in darkened units, equipped with battery powered aerators to oxygenate water. Upon full recovery, captured fish will be released at the point of capture. Other factors such as operator expertise, frequency, voltage level, band width and pulse rate, and forms of electrical current are known to affect injury rates while employing this capture technique (Dalbey et al. 1996). Only experienced personnel will be allowed to operate the electrofishing equipment and handled captured fish. Guidelines for electrofishing waters containing salmonids listed under the endangered species act (NMFS 1998) will be strictly adhered to.

H. DESCRIPTION AND ESTIMATES OF TAKE

H.1 Describe the status and trends, at population level, of the species to be taken

Middle Skagit River Salmon Spawning Surveys

See Section F.1 for status of the Lower Skagit River Chinook run. Recent salmonid spawning survey efforts conducted by PSE and R2 have targeted Chinook spawning in the Skagit River between the Baker River confluence (RM 56.5) and the pipeline crossing above Sedro Woolley (RM 24.5) (R2 2006b). Redd counts recorded during the PSE/R2 spawning surveys however have not been used to develop escapement estimates.

Baker River Basin Electrofishing Surveys

The status of Chinook in the Baker River Basin is not well understood. During 2001-2005, an average of 34 adult Chinook have been transported upstream from the lower Baker River trap and released into Baker Lake. Adult Chinook collected at the lower Baker River adult upstream fish passage facility between June 1 to August 15 are currently transported upstream to Baker Lake. Chinook collected at the lower Baker River trap after August 15 are transported to the Skagit River or to Marblemount Hatchery. Actively spawning adult Chinook have been observed in the upper Baker River during previous bull trout snorkel surveys conducted from 2001-2005 (R2 2006a). The peak counts of adult Chinook observed during fall surveys of the upper Baker River in 2001, 2003, 2004, and 2005 ranged from 5 to 9 fish.

Over the last ten years (1996-2005), an average total of 1,530 juvenile Chinook have been collected each year in the Baker Lake downstream fish passage facility. The maximum number of juvenile Chinook collected during this period was 4,309 in 2004, while the minimum number collected was 429 in 1996.

H.2 Provide justification for all take mortalities by take category

Middle Skagit River Salmon Spawning Surveys

No take mortalities are anticipated to result from the proposed middle Skagit River spawning survey efforts.

Baker River Basin Electrofishing Surveys

Although the rate of electrofishing mortality observed in other R2 studies is low (see G4.), a juvenile Chinook mortality could occur as part of Baker River Basin

electrofishing efforts. The Baker Basin electrofishing efforts will support ongoing recovery efforts of native char in the Skagit Basin and provide information on the genetic make-up of bull trout populations.

H.3 Provide details on how all take estimates, including mortalities, were derived **Middle Skagit River Salmon Spawning Surveys**

A total of 1,800 adult Chinook (Puget Sound DPS) of wild origin are requested for incidental take (observe/harass) for work associated with the proposed middle Skagit River salmon spawning surveys (Table 2). Although there are no take prohibitions for listed hatchery fish with a clipped adipose fin or otherwise marked, a total of 200 adult listed Chinook of hatchery origin may be observed/harassed during this study effort. No mortality of wild or hatchery origin adult Chinook is expected to result from the proposed activity.

The take estimate was based on previous redd counts recorded in the middle Skagit River survey reach (RM 56.5 - RM 24.5). During spawning surveys conducted by PSE and R2 in 2002 and 2004, a total of 605 and 608 redds were measured in the middle Skagit River survey reach, respectively (R2 2003, R2 2005). Based on these redd counts, it is conservatively estimated that a total of 800 redds may possibly be measured during one survey season. Assuming 2.5 fish per redd, the estimated take was calculated to be a total of 2,000 Chinook that would potentially be observed/harassed during spawning surveys each year. The annual proportion of direct hatchery-origin and listed natural-origin fish on natural spawning grounds is unknown (WDFW 2002). Since the take prohibition is directed at natural-origin fish, the estimate of 1,800 adult wild fish reflects a conservative assumption of 90 percent wild fish.

Washington Department of Fish and Wildlife. 2002. Hatchery and Genetic Management Plan. Skagit River Summer Chinook Program, Skagit River, Puget Sound Region. Prepared by WDFW, Olympia, Washington. August 21, 2002.

Baker River Basin Electrofishing Surveys

A total of 45 juvenile Chinook (Puget Sound DPS) of wild origin are requested for incidental take (capture/handle) and one juvenile wild Chinook mortality is requested during work associated with the proposed Baker River Basin electrofishing surveys (Table 3). Although there are no take prohibitions for listed hatchery fish with a clipped adipose fin or otherwise marked, a total of five juvenile

Chinook of hatchery origin may be captured/handled during this study effort and one juvenile hatchery Chinook mortality is requested during work associated with the proposed Baker River Basin electrofishing surveys

Low numbers of juvenile Chinook have been captured at the Baker Lake downstream passage facility in recent years. Over the last ten years (1996-2005), an average total of 1,530 juvenile Chinook have been collected each year in the Baker Lake downstream fish passage facility. Based on this accounting of outmigrating juvenile Chinook from Baker Lake, it is believed that juvenile Chinook are not present in great numbers in the upper Baker River. In general, Chinook salmon are known to inhabit the lower reaches of streams. The number of juvenile Chinook present in the proposed headwater survey areas of the upper Baker River subbasin is likely to be very low. Based on these factors, it is conservatively estimated that a total of 50 juvenile Chinook may be incidentally captured and handled as a result of upper Baker River electrofishing survey efforts (Table 3).

The proportion of natural-origin and hatchery-origin juvenile Chinook in Baker Basin tributary streams is unknown. Under the existing handling protocols for the Baker Project upstream fish passage facility, only unmarked adult Chinook without coded wire tags that enter the trap between June 1 and August 15 are transported and released into Baker Lake. Some of these fish presumably spawn and are the source of the juvenile Chinook captured at the downstream fish collector. However, for the past several years, juvenile Chinook from the Marblemount Hatchery have been released in the Baker adult fish trap to allow them to acclimate in the lower Baker River. Some of these juvenile hatchery fish may have been collected along with adult sockeye and inadvertently transported upstream and released into Baker Lake. Starting in 2006, juvenile Chinook from the Marblemount Hatchery have been released upstream of the Baker River barrier dam in an effort to reduce the unintentional collection and upstream transport of juvenile Chinook. Some adipose-clipped and/or coded wire tagged fish that were transported and released into Baker Lake prior to 2006 may be captured during future electrofishing surveys. The estimate of take in Table 3 was developed by conservatively assuming that 90 percent of the adult Chinook observed in the Baker River Basin will be of wild origin. Assuming that 45 wild and five hatchery-origin juvenile Chinook are captured by electrofishing, and assuming a 0.5% mortality rate, the calculated mortality rate is less than one wild and one hatchery origin

juvenile Chinook. A mortality of one juvenile wild and one juvenile hatchery Chinook was assumed for the electrofishing efforts and derived by rounding up from the calculated value.

Table 2. Estimation of Chinook salmon take for the proposed Middle Skagit River Salmon Spawning Surveys.

ESU/ Species	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Puget Sound/ Chinook	Adult	Naturally spawned	Observe /Harass	1,800/ year	0	Middle Skagit River, from RM 56.5 to RM 24.5	2007-2011 (fall and winter of each year)
Puget Sound/ Chinook	Adult	Listed hatchery clipped adipose	Observe /Harass	200/ year	0	Middle Skagit River, from RM 56.5 to RM 24.5	2007-2011 (fall and winter of each year)

Table 3. Estimation of Chinook salmon take for the proposed Baker River Basin Electrofishing Surveys.

ESU/ Species	Life Stage	Origin	Take Activity	Number of Fish Requested	Requested Unintentional Mortality	Research Location	Research Period
Puget Sound/ Chinook	Juvenile	Naturally spawned	Capture/ Handle	45	1	Upper Baker River tributaries and Sulphur Creek	2007-2010 (June, July, August of each year)
Puget Sound/ Chinook	Juvenile	Listed hatchery clipped adipose	Capture/ Handle	5	1	Upper Baker River tributaries and Sulphur Creek	2007-2010 (June, July, August of each year)

H.4 Include a statement as to whether USFWS listed species will be affected, including which species and DPS and the authority you have to take the species.

Middle Skagit River Salmon Spawning Surveys

No USFWS listed species will likely be affected as a result of the proposed middle Skagit River spawning survey effort. Bull trout tend to spawn in the upper reaches of tributary streams and the middle Skagit River is not considered spawning habitat, but is considered foraging, migration, and overwintering habitat (69 FR 122, page 35790).

Baker River Basin Electrofishing Surveys

Baker River Basin Electrofishing Surveys will target USFWS listed bull trout (*Salvelinus confluentus*). Bull trout in the upper Baker River Basin are within the Coastal-Puget Sound DPS and are considered part of the lower Skagit River subpopulation. The lower Skagit River bull trout subpopulation is the only one considered “strong” by the U.S. Fish and Wildlife Service (USFWS) in the Puget Sound analysis area based on the large number of spawning adults and high overall abundance (64 FR 58910). Work conducted in the Baker River Basin between 2002 –2005 that affected bull trout was covered under USFWS Permit #TE005113-4, however this permit has recently expired and a renewal application is currently being reviewed by the USFWS.

I. TRANSPORTATION AND HOLDING

I.1 Transportation of a Listed Species

No listed species, including Chinook and bull trout, will be transported as a result of activities described in this application. All Chinook and bull trout captured during proposed activities will be held temporarily to allow full recovery, and then will be released at the point of capture.

I.2 Holding of a Listed Species

I.2.a Dimensions of the holding facility, and number of individuals, by species, life stage, and origin, to be held in each.

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort.

Baker River Basin Electrofishing Surveys

Juvenile Chinook incidentally captured during the proposed electrofishing survey effort will be held in live cages (2 feet x 2 feet x 4 feet) or dark-colored, covered buckets (5 gallon) until fully recovered, then will be released to the point of capture. A maximum of 10 Chinook will be held per container. No adult Chinook will be captured during the proposed effort. Areas will be snorkeled prior to electrofishing to ensure the absence of adult Chinook salmon in the survey area. Juvenile Chinook in the upper Baker River subbasin are likely of naturally spawned and hatchery released origin, and each will be held in the same manner.

I.2.b The water supply, amount, and quality, including controls on temperature and dissolved oxygen.

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort.

Baker River Basin Electrofishing Surveys

Juvenile Chinook will not be moved from the sample site, and water used for holding and the recovery process will be obtained from the survey stream. Water within the holding units will be replenished with fresh water as necessary in order to facilitate the recovery process. In addition, battery operated aerators will be used to oxygenate the water used to hold captured fish. Electrofishing surveys will not be conducted if water temperatures are above 16° C.

I.2.c The amount and type of diet

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort.

Baker River Basin Electrofishing Surveys

Juvenile Chinook incidentally captured during the proposed electrofishing surveys will be held only until they have recovered from the effects of electrofishing, no fish will be fed during the recovery period.

I.2.d Sanitation practices

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort.

Baker River Basin Electrofishing Surveys

Juvenile Chinook incidentally captured as a result of the proposed electrofishing activities will be held in water obtained from the survey site and fresh water will be supplied frequently throughout the holding period.

I.3 Emergency contingencies

Middle Skagit River Salmon Spawning Surveys

No Chinook will be captured or held during the proposed middle Skagit River spawning survey effort so emergency contingencies have been developed.

Baker River Basin Electrofishing Surveys

Juvenile Chinook incidentally captured during proposed electrofishing surveys will be held until recovered, then released. If any fish is slow to recover, surveyors will provide fresh, oxygenated water from the survey site in order to revive stressed fish.

J. COOPERATIVE BREEDING PROGRAM

Data collected in association with activities identified in this application will be maintained and made available to interested parties as part of the ongoing Baker Project licensing process.

K. PREVIOUS OR CONCURRENT ACTIVITIES INVOLVING LISTED SPECIES

K.1 Identify all previous permits where you were the permit holder or primary investigator working with federally-listed species; identify which species

Arnold A. Aspelund has been the primary permit holder for NMFS Permit #1372, which covers Puget Sound DPS Chinook, since 2002.

Bull trout studies conducted as part of Baker Project relicensing efforts between 2002 –2005 were covered under USFWS Permit #TE005113-4.

K.2 For the above permits, list all mortality events of listed species that have occurred in the last five years.

No mortalities of listed species have occurred during any activities associated with Permit #1372.

One adult bull trout mortality occurred in 2002 during angling surveys that were conducted using single barbless hooks on artificial lures under USFWS Permit #TE005113-4.

L. CERTIFICATION

“I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (ESA) and regulations promulgated thereunder, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or to penalties under the ESA.”

Signature

Date

Arnold A. Aspelund, Senior Natural Resource Scientist
Name and Position Title

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